In 1882 the Swedish geologists, A. G. Nathorst and G. de Geer made a journey which furnished interesting data about the geology and flora of the islands. In the same year a Swedish meteorological station was established at Cape Thordsen for carrying on the observations desired by the international polar committee. During the last decade of the 19th century Spits­bergen attracted not only a number of scientists but also sports­men and tourists. Such expeditions as those of Gustaf Norden- skiöld in 1890 and the important circumnavigation by Nathorst in 1898, during which the Wiche Islands and White Islands were carefully explored, confined their attentions almost en­tirely to the coasts. In 1892 Μ. C. Rabot made the first serious attempt to penetrate the interior from the head of Ice Fjord, exploring a part of the Sassendal; and in 1896 Sir Martin Conway led an expedition which crossed the island for the first time, and surveyed the region between Ice Fjord and Bell Sound on the east coast. In 1897 Conway and Mr E. J. Garwood surveyed the glaciated area north of Ice Fjord to about 78° 10' N., and climbed Horn Sund Tind. In the same year Herr André made his fatal balloon ascent from Danes Island with the intention of floating over the Pole. In 1896 a weekly service of Norwegian tourist steamers was established in summer, and a small inn was built at Advent Bay in Ice Fjord, and though this was afterwards closed, the west coast continued to be fre­quently visited by tourist steamers during the height of summer. In 1898, 1899 and 1906 the prince of Monaco made scientific investigations in the Archipelago, and in 1898-1902 Swedish and Russian expeditions undertook the measurement of an arc of the meridian, the results of which were accompanied by valuable physiographical, meteorological, botanical and other obser­vations. Dr W. S. Bruce made a complete survey and scien­tific investigations of Prince Charles Foreland. In 1900 coal began to be worked on Advent Bay, a seam 10 ft. thick being found below 40 ft. of fossil ice and 20 ft. of rock. This develop­ment and other considerations led to some discussion between the powers interested as to the territorial sovereignty over the archipelago, a question which though approached before (as in 1870) had never been brought to a settlement.

Bibliography.—On a land visited by so many scientific observers the literature is naturally voluminous. The chief source of scientific papers is the publications of the Swedish *Vetenskaps Akademie.* Sir W Martin Conway narrates his expedition in the *First Crossing of Spitsbergen* (London, 1897) ; and in *No Man’s Land* (Cambridge, 1906) he details the history of the Archipelago down to 1840, tabulates the principal voyages and incidents thereafter until 1900, and furnishes a very full bibliography for the history and geography of Spitsbergen from the earliest time down to 1902. The various observations of the Swedish expedition for the measurement of an arc of the meridian were brought together (in French) in *Missions scientifiques pour la mesure d’un arc de méridien au Spitzberg . .* . (Stockholm, 1903-1906), and those of the Russian expedition under the same title in 1904, seq. (St. Petersburg).

**SPITTA, FRIEDRICH** (1852- ), German Protestant

theologian, was born at Wittingen on the 10th of January 1852. His father, Karl Johann Philipp (1801-1859), well known as a hymn-writer (see *Lyra domestica,* 1st series, London, 1860; 2nd series, 1864), was superintendent at Burgdorf near Hanover. Friedrich studied at Göttingen and Erlangen, and in course of time became (1887) professor Ordinarius and univer­sity preacher at Strassburg. In 1896 he became joint-editor with J. Smend of the *Monatsehrift für Gottesdienst und kirch­liche Kunst,* and he is widely known as the author of a work on the Acts of the Apostles *(Die Apostelgeschichte, ihre Quellen und deren geschichtlicher Wert* (1891).

His other works include: *Der Knabe Jesus, eine biblische Geschichte und ihre apokryphischen Entstellungen* (1883), *Die Offenbarung des Johannes* (1889), *Zur Reform des evang. Kultus* (1891), and *Zur Geschichte und Litteratur des Urchristentums* (3 vols., 1893-1901).

SPLEEN (Gr. *σπλήv*), a vascular organ situated on the left side of the abdomen (see Ductless Glands). It was supposed in olden times to be the seat of ill-humour and melancholy, whence such phrases as “ to have the spleen," to be out of temper, sulky, morose, “ splenetic.”

SPLÜGEN PASS, one of the passes across the main chain of the Alps from Switzerland to Italy (from 1512 to 1797, however,

Chiavenna belonged to the Grisons). The route quits that of the Albula Pass *(q.v.)* at Thusis, passes first through the celebrated gorge of the Via Mala, then through the Schams basin and past Andeer, beyond which the Rofna gorge gives access to the village of Splügen (from which the pass takes its name) in the upper reach of the main or Hinter branch of the Rhine *(q.v.).* Leaving to the west the road over the San Bernardino Pass, 6769 ft. (by which the St Gotthard railway line is joined at Biasca, the route lying entirely through Swiss territory) the Splügen road (constructed in 1823) mounts south to the pass (6946 ft.), which forms the political frontier. On the other side the road avoids the old path through the dreaded Car- dinello gorge (here passed Macdonald’s army in December, 1800) in order to descend by zigzags to Pianazzo. Thence past Campo Dolcino and Gallivaggio the descent is made to the ancient town of Chiavenna at the junction of the road from the upper Engadine over the Maloja Pass, and 17 m. by rail above Colico, at the northern end of the lake of Como. The distance by road from Splügen village (16 m. above Andeer) to Chia­venna is 25 m. The diligences take 51/2 hours from Splügen vil­lage (4 hours above Thusis) to Chiavenna. But by the proposal to pierce a railway tunnel of about 16 m. in length from Andeer to Gallivaggio, it was calculated that the Splügen line would become the shortest route from southern Germany to Milan, while at Chiavenna it would receive the traffic from the upper Engadine. (W. A. B. C.)

**SPODUMENE, a** lithium-aluminium silicate belonging to the pyroxene group (see Pyroxene). It was named by B. J. d’Andrada e Sylva, in 1800, from Gr. *σπόδιος* (ash-coloured), in allusion to its grey colour. Soon afterwards J. R. Haüy termed it *triphane,* because it exhibited certain characteristics equally in three directions *(τpιφανής,* appearing three-fold). Spodumene crystallizes in the monoclinic system, the crystals having generally a prismatic habit and being often striated longitudinally. It has perfect prismatic cleavage, and imper­fect cleavage parallel to the clinopinacoid, whilst a lamellar structure may be developed by parting along the orthopinacoid. The hardness is 6∙5 to 7, and the specific gravity about 3·16. Though generally a dull mineral, some varieties of spodumene are so brightly coloured and transparent as to be valued as gem-stones. Such is the emerald-green hiddenite *(q.v.)* and the lilac-coloured kunzite *(q.v.),* whilst a yellow or yellowìsh- green spodumene found as pebbles in the state of Minas Geraes, in Brazil, resembles, when cut, some kinds of chrysoberyl. Common spodumene is used as a source of lithium in chemical preparations.

Spodumene occurs in granite and crystalline schists. The original specimens came from the isle of Utö in Södermanland, Sweden, but the finest examples are found in the United States, especially in Massachusetts, where Goshen, Sterling and Chester­field are well-known localities. Very fine specimens have been obtained from the Black Hills of S. Dakota. Some remarkable deposits containing spodumene were discovered many years ago at Branchville, Fairfield county, Connecticut, and the minerals which they yielded were exhaustively studied by Professor G. J. Brush and E. S. Dana. The spodumene occurred in large quantity, in a vein of albite-granite, associated with apatite, garnet, columbite, pitchblende and other uranium minerals, together with several species of manganese phosphates, termed eosphorite, triploidite, dickinsonite, lithiophilite, natrophilite, reddingite, fairfieldite and fillowite. The spodumene, which has normally the formula LiAl (SiO3)2, becomes altered at Branch­ville to what has been called *ß*-spodumene, which consists really of the mineral eucryptite (LiAlSiO4) and albite. Eucryp­tite was named by Brush and Dana from *ευ* (well) and *κpυπτός* (concealed). Further alteration results in the formation of cymatolite, a mineral described by C. U. Shepard in 1867, but shown to be an intimate mechanical mixture of muscovite and albite. The final products of alteration of the spodumene may be muscovite, albite and microcline. The mineral dis­covered in 1817 in the granite of Killiney Hill, near Dublin, and described by T. Thomson as killinite, appears to be an altered spodumene. (F. W. R.\*)